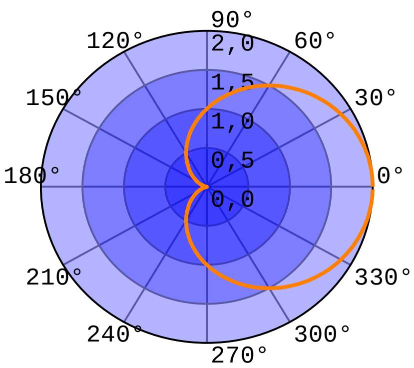
Отображение графика в полярных координатах

```
appVersion(4) = "1.73.9126.0"

XYPolar(a, b) := if length(stack(a)) = 1
                    F(f, z, clr) := [f  z^T  clr  "solid"  1]^T
                    [g := [0, 30..330]   g° := vectorize(concat(num2str(g), "°"))   P := [0, b..a]]
                    [X  Y] := a · [vectorize(cos(g °))  vectorize(sin(g °))]
                    [k := [1..a/b]   C := 0   C_k := F("circle", [0  0  (k − 1)·b], "gray")]
                    [k := [1..length(g)]   L := 0   L_k := F("line", [0  0  X_k  Y_k], "gray")]
                    G := augment(X − 0.25·a·vectorize(90<g<270), Y + 0.15·a·vectorize(0≤g≤180), g°)
                    { [stack(L, C, [F("circle", [0  0  a], "black")])]
                    { augment(stack(G, augment(0, P, vectorize(var2str(P, 1)))), 9)
                 else
                    augment(vectorize(b·cos(a)), vectorize(b·sin(a)))
```

ToDo: Improve G,
using the font size
and plot zoom.

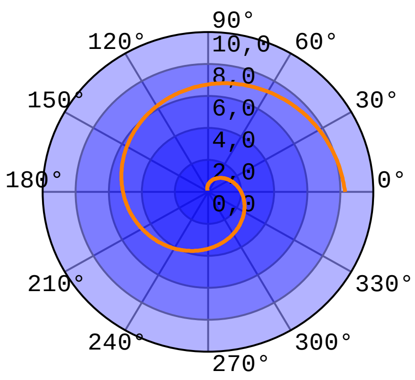
```
Notation

if length(stack(a)) = 1
    [ρmax = a   ρtick = b]
else
    [φ = a   ρ = b]
```

r = 1 + cos(φ)



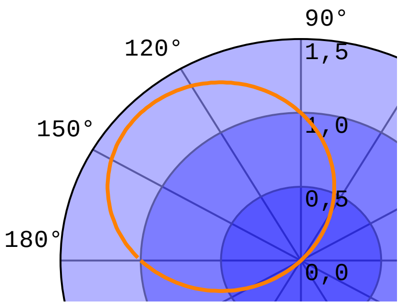

```
{ XYPolar(2, 0.5)
{ XYPolar(φ := [0, 1..359] °, vectorize(1 + cos(φ)))
```

r = 2 - φ



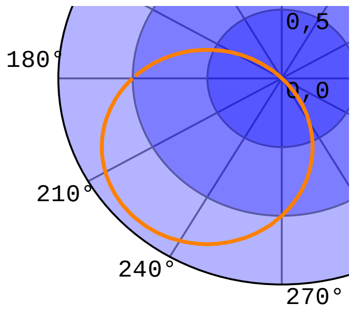

```
{ XYPolar(10, 2)
{ XYPolar(φ := [−360, −359..110] °, vectorize(2 − φ))
```

r = - cos(φ) + sin(φ)




```
{ XYPolar(1.5, 0.5)
{ XYPolar(φ := [0, 1..179] °, vectorize(− cos(φ) + sin(φ)))
```

r = - cos(φ) - sin(φ)



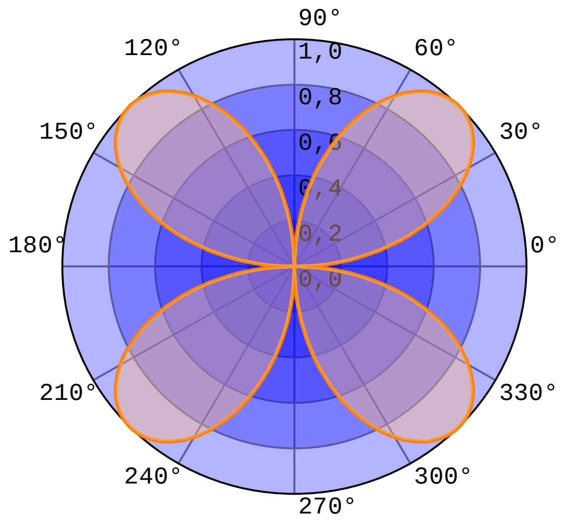

```
{ XYPolar(1.5, 0.5)
{ XYPolar(φ := [0, 1..179] °, vectorize(− cos(φ) − sin(φ)))
```

Note: original have
different ranges:

$$\varphi_3 := \left[\frac{3}{4}, 0.76 .. \frac{7}{4}\right] \cdot \pi$$

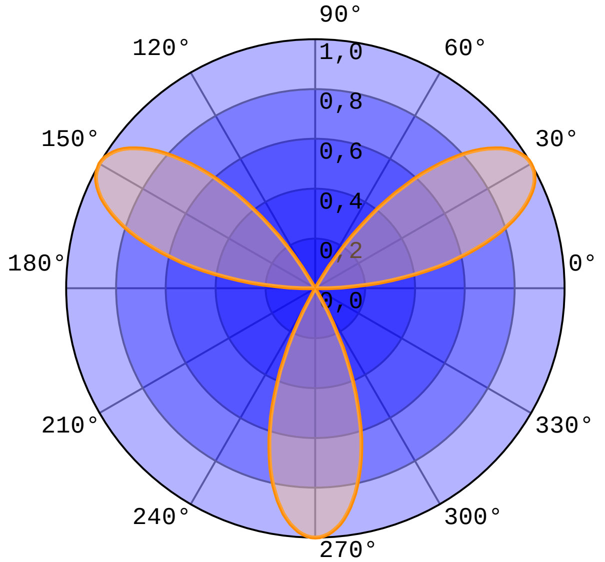
$$\varphi_4 := \left[\frac{5}{4}, 1.26 .. \frac{9}{4}\right] \cdot \pi$$

r = | sin(2·φ) |



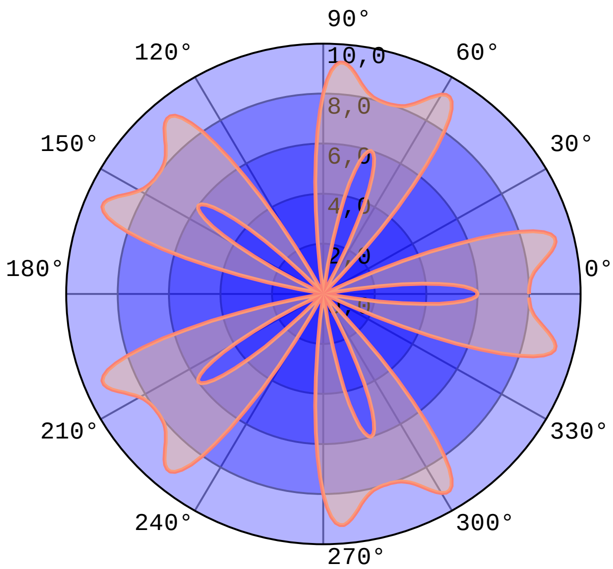

```
XYPolar (1, 0.2)
XYPolar (φ:=[0,1..359]°, |sin(2·φ)| →)
```

r = sin(3·φ)




```
XYPolar (1, 0.2)
XYPolar (φ:=[0,1..180]°, sin(3·φ) →)
```

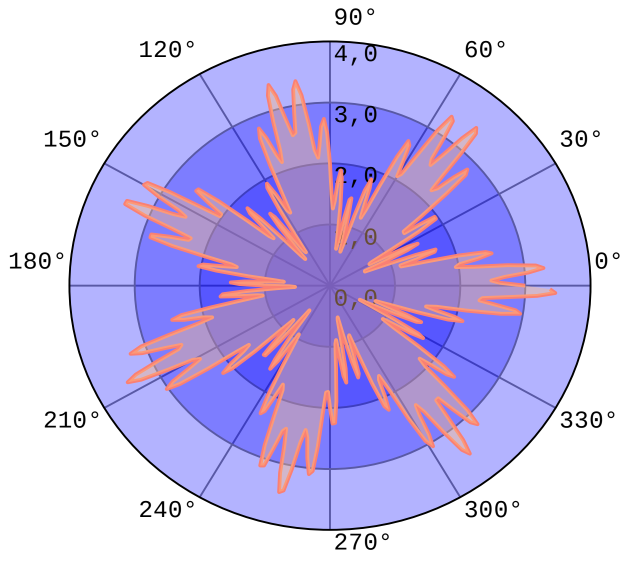
r = 1 + 7·cos(5·ϕ) + 4·sin²(5·ϕ) + 3·sin⁴(5·ϕ)



$r_7(\varphi) := 1 + 7 \cdot \cos(5 \cdot \varphi) + 4 \cdot (\sin(5 \cdot \varphi))^2 + 3 \cdot (\sin(5 \cdot \varphi))^4$

```
XYPolar (10, 2)
XYPolar (φ:=[0,1..359]°, r7(φ) →)
```

r = 2 − ½·sin(50·ϕ) + cos(7·ϕ)



$r_8(\varphi) := 2 - 0.5 \cdot \sin(50 \cdot \varphi) + \cos(7 \cdot \varphi)$

```
XYPolar (4, 1)
XYPolar (φ:=[0,1..359]°, r8(φ) →)
```